



Impact of Pressure on Glass Transition Behavior of a Metal-Organic Framework Glass

Qiao, Ang; Stepniewska, Malwina; Tao, Haizheng; Calvez, Laurent; Zhang, Xianghua; Yue, Yuanzheng

Publication date:
2019

Document Version
Early version, also known as pre-print

[Link to publication from Aalborg University](#)

Citation for published version (APA):

Qiao, A., Stepniewska, M., Tao, H., Calvez, L., Zhang, X., & Yue, Y. (2019). *Impact of Pressure on Glass Transition Behavior of a Metal-Organic Framework Glass*. Abstract from 25th International Congress on Glass, Boston, Massachusetts, United States.

General rights

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal -

Take down policy

If you believe that this document breaches copyright please contact us at vbn@aub.aau.dk providing details, and we will remove access to the work immediately and investigate your claim.

Impact of Pressure on Glass Transition Behavior of a Metal-Organic Framework Glass

Ang Qiao^{1,2*}, Malwina Stepniewska¹, Haizheng Tao², Laurent Calvez³, Xianghua Zhang³,
Yuanzheng Yue^{1,2}

¹Department of Chemistry and Bioscience, Aalborg University, DK-9220 Aalborg, Denmark

²State Key Laboratory of Silicate Materials for Architectures, Wuhan University of Technology, Wuhan 430070, China

³Laboratory of Glasses and Ceramics, Institute of Chemical Science, University of Rennes 1, 35042 Rennes, France

*Presenting author. E-mail: aq@bio.aau.dk

A newly emerged family of melt-quenched glasses - metal-organic framework (MOF) glasses with network structure, show a number of fascinating physical properties, distinct from those of traditional families of glasses (organic, inorganic and metallic glasses). In this presentation, we report on the influences of pressure on the glass transition temperature (T_g) of ZIF-62 ($\text{Zn}(\text{Im})_{1.75}(\text{bIm})_{0.25}$) glass, which was prepared by spark plasma sintering (SPS) method. It is found that the T_g (558K) of ZIF-62 glass produced by SPS method is much lower value than that (595K) prepared by the conventional melt-quenching method. This indicates that the pressure (50 MPa) applied by SPS method to the glass samples densify the glass structure, thereby lower T_g . This behavior is in strong contrast to that of other types of network glasses, since their T_g values remain unchanged under such low pressure. Reheating the as-prepared glass leads to relaxation of the compressed structure to the unconstrained state, and hence, its T_g increase to that of the not pressed ZIF-62 glass. We discuss the structural origin of the decrease of T_g induced by pressure. This work sheds light on the glass transition and relaxation in MOF glasses.